

Appl. No. 10/731,496
Amdt. dated August 22, 2006
Reply to Office action of May 23, 2006

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AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0026] with the following amended paragraph, per the Examiner's comments during the Office Interview:

[0026] According to the present invention, the orienter assembly 10 of the present invention is positioned in front of the drilling motor assembly 20, just behind the rotating drill bit 130. The orienter assembly 10 includes a ~~rotatable~~ housing 30 which may be divided into an upper section 32 and a lower rotatable section 34. Finally, at the distal end 102 of the drilling tool assembly 100 is the rotating drill bit 130. It is the rotating drill bit 130 which actually cuts through the soils and the rock to form the subterranean borehole B. Linear force is transmitted to the drilling tool assembly 100 by the force placed on the coiled tubing 110 by the injector assembly 140. The linear force moves the rotating drill bit 130 forward as the rotating drill bit 130 cuts through the soil and rock at the drill face at the end of the borehole.

Please replace paragraph [0027] with the following amended paragraph, per the Examiner's comments:

[0027] In Figure 2 the lower rotatable section ~~housing 30 34~~ is held fast; that is, it does not rotate. Accordingly, the fixed bend 36 in the lower rotatable section ~~housing 30 34~~ of the orienter 10 causes the rotating drill bit 130 to form an arcuate segment of the borehole B. As shown in exaggerated manner in Figure 2, if the fixed bend 36 is in a substantially vertical plane, the drilling tool assembly 100 will form an arcuate

Appl. No. 10/731,496
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segment of the borehole **B** which tracks upwardly to the earth's surface **S**, thereby allowing for removal of the drilling tool assembly **100** from the end **115** of the coiled tubing **110** after the drilling tool assembly **100** exits the borehole.

Please replace paragraph [0028] with the following amended paragraph, per the Examiner's comments:

[0028] In contrast, the lower rotatable section ~~housing~~ **30 34**, shown in Figure 3 is not held fast or in a fixed position; instead it is allowed to turn. The turning of the lower rotatable section ~~housing~~ **30 34**, to include both the ~~upper section 32, the fixed~~ bend **36**, and the lower ~~portion~~ section **34**, with respect to the non-rotary housing **22** around the drilling motor **20**, enables the rotating drill bit **130** to cut a straight line segment of a large borehole. The transfer of torque from the drive shaft **24** portion of the drilling motor assembly **20** to the ~~rotatable housing 30~~ upper section 32 causes the entire lower rotatable section ~~housing~~ **30 34** to turn as shown in Figure 3.

Please replace paragraph [0029] with the following amended paragraph, per the Examiner's comments:

[0029] In a macro sense, the housing **30** of the disclosed orienter **10** looks like an extension of the non-rotating housing **22** which surrounds the drill motor **20**. However, housing **30** of the orienter 10 is separate from housing **22**. This separation allows the external, lower rotatable section ~~housing~~ **30 34** with a fixed bend **36** to rotate constantly at a minimal rpm while the drill motor assembly **20** causes the rotating drill bit **130** to move straight ahead with an oscillating action and thereby form a

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straight segment of the borehole **B**, as shown in Figure 3. Disengagement of the mechanical connection between the external, ~~rotatable housing 30~~ upper section 32 from the drive shaft **24** portion of the drill motor assembly **20** and the indexing of the lower rotatable section housing 30 34 to the desired clock face position has the effect of placing the rotating drill bit **130** in a directional or steering mode as shown in Figure 2 because the fixed bend **36** in the external, lower rotatable section housing 30 34 does not rotate. However, because the drive shaft **24** of the drilling motor **20** is still connected to the rotating drill bit **130** by a universal joint or flexible coupling **26**, the rotating drill bit continues to turn.

Please replace paragraph [0030] with the following amended paragraph, per the Examiner's comments:

[0030] As shown in Figure 4, the necessary drive force or rotational torque which causes the external, lower rotatable section housing 30 34 with a fixed bend **36** to turn is obtained from the drive shaft ~~22~~ 24 of the drill motor assembly **20**. In the preferred embodiment, connection of the external, lower rotatable section housing 30 34 with a fixed bend **36** to the drive shaft **24** of the drill motor **20** is accomplished by the use of a mechanical clutch mechanism **40**.

Please replace paragraph [0032] with the following amended paragraph, per the Examiner's comments:

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[0032] In the preferred embodiment, an internal gear assembly 60 within the ~~rotatable housing 34~~ upper section 32 is used. The internal gear assembly 60 includes a plurality of externally toothed spur gears 62. The rotation of the spur gears 62 causes rotation of the external housing 30 by engagement of a large-internally toothed ring gear 64 with the rotating spur gears 62. The gear ratio between the spur gears 62 and the ring gear 64 provides for a reduction in speed and an increase in torque. The end result is a circular movement of the ~~housing~~ lower rotatable section 34 including the fixed bend 36 and the rotating drill bit 130 to drill a straight borehole through soil and rocks. Those of ordinary skill in the art will understand that while a simple speed reduction gear train has been shown in the preferred embodiment, other speed reducing or torque mechanisms may be used without departing from the scope of the invention, to include but not limited to a hydraulic drive or a helical actuator.

Please replace paragraph [0033] with the following amended paragraph, per the Examiner's comments:

[0033] To assure proper clock face position of the lower rotatable section ~~housing 30 34~~ with respect to the non-rotating housing 22 surrounding the motor assembly 20 or torque transfer, a set of radially spaced contact points or similar radial position indicating systems, well known to those of ordinary skill in the art, may be used to provide a signal representative of the clock position of the lower rotatable section ~~housing 30 34~~. As the lower rotatable section ~~housing 30 34~~ is selectively rotated or indexed to a desired orientation by the motor 20, a single contact closes a circuit at a location representative of the clock face position of the lower rotatable

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section housing 30 34. The signal is received at the surface using a wireless transmission or a wire line. Knowledge of the clock face position of the lower rotatable section housing 30 34 enables the operator to assure that the fixed bend portion 36 of the orienter 10 is properly rotated or indexed to the desired orientation to create an arcuate segment of the borehole B which follows along a predetermined path.